THE RANCH PLAN PLANNED COMMUNITY

PLANNING AREAS 3 AND 4 RUNOFF MANAGEMENT PLAN

Michael Baker INTERNATIONAL

TECHNICAL APPENDIX M

Worksheet 3: Factor of Safety and Design Infiltration Rate and Worksheet

Worksheet 3: Factor of Safety and Design Infiltration Rate and Worksheet - 3A-3

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			2
B	Design	Tributary area size	0.25	3	0.75
		Level of pretreatment/ expected sediment loads	0.25	3	0.75
		Redundancy/contingency plan	0.25	3	0.75
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			2.75
Combined Safety Factor, $S_{Total} = S_A \times S_B$					5.5
Observed Infiltration Rate, inch/hr, K_{obs} (corrected for test-specific bias)					4
Design Infiltration Rate, in/hr, $K_{design} = K_{obs} / S_{Total}$					0.73

Briefly describe infiltration test and provide reference to test forms:
Infiltration testing has not been performed at this location yet. The observed infiltration rate used is an estimated provided per conversation with the geotechnical engineer.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

Worksheet 3: Factor of Safety and Design Infiltration Rate and Worksheet - 3A-4

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			2
B	Design	Tributary area size	0.25	3	0.75
		Level of pretreatment/ expected sediment loads	0.25	3	0.75
		Redundancy/contingency plan	0.25	3	0.75
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			2.75
Combined Safety Factor, $S_{Total} = S_A \times S_B$					5.5
Observed Infiltration Rate, inch/hr, K_{obs} (corrected for test-specific bias)					4
Design Infiltration Rate, in/hr, $K_{design} = K_{obs} / S_{Total}$					0.73

Briefly describe infiltration test and provide reference to test forms:
Infiltration testing has not been performed at this location yet. The observed infiltration rate used is an estimated provided per conversation with the geotechnical engineer.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

Worksheet 3: Factor of Safety and Design Infiltration Rate and Worksheet - 3B-5

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	1	0.25
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.5
B	Design	Tributary area size	0.25	3	0.75
		Level of pretreatment/ expected sediment loads	0.25	3	0.75
		Redundancy/contingency plan	0.25	3	0.75
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			2.75
Combined Safety Factor, $S_{Total} = S_A \times S_B$					4.125
Observed Infiltration Rate, inch/hr, K_{obs} (corrected for test-specific bias)					2.2
Design Infiltration Rate, in/hr, $K_{design} = K_{obs} / S_{Total}$					0.53

Briefly describe infiltration test and provide reference to test forms:
Observed infiltration rate was determined as the average rates of test pits DH-24 and DH-26. GMU conducted the testing using the Shallow Percolation Test Procedure. Test pit locations and rates can be found in the September 18, 2018 geotechnical report included in Appendix N.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

Worksheet 3: Factor of Safety and Design Infiltration Rate and Worksheet - 3C-2

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	2	0.5
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
B	Design	Tributary area size	0.25	3	0.75
		Level of pretreatment/ expected sediment loads	0.25	2	0.5
		Redundancy/contingency plan	0.25	3	0.75
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			2.5
Combined Safety Factor, $S_{Total} = S_A \times S_B$					4.375
Observed Infiltration Rate, inch/hr, K_{obs} (corrected for test-specific bias)					17.5
Design Infiltration Rate, in/hr, $K_{design} = K_{obs} / S_{Total}$					3.99

Briefly describe infiltration test and provide reference to test forms:
Observed infiltration rate was determined as the average rates of test pits TP-02, TP-49, TP-50, TP-51, and TP-54. GMU conducted the testing using the Shallow Percolation Test Procedure. Test pit locations and rates can be found in the September 18, 2018 geotechnical report included in Appendix N.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

Worksheet 3: Factor of Safety and Design Infiltration Rate and Worksheet - 3D-5

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			2
B	Design	Tributary area size	0.25	3	0.75
		Level of pretreatment/ expected sediment loads	0.25	3	0.75
		Redundancy/contingency plan	0.25	3	0.75
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			2.75
Combined Safety Factor, $S_{Total} = S_A \times S_B$					5.5
Observed Infiltration Rate, inch/hr, K_{obs} (corrected for test-specific bias)					9.6
Design Infiltration Rate, in/hr, $K_{design} = K_{obs} / S_{Total}$					1.75

Briefly describe infiltration test and provide reference to test forms:
Observed infiltration rate was determined by of test pit TP-14. GMU conducted the testing using the Shallow Percolation Test Procedure. Test pit location and rate can be found in the September 14, 2017 geotechnical report included in Appendix N.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

Worksheet 3: Factor of Safety and Design Infiltration Rate and Worksheet - 3G-1a

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			2
B	Design	Tributary area size	0.25	3	0.75
		Level of pretreatment/ expected sediment loads	0.25	3	0.75
		Redundancy/contingency plan	0.25	3	0.75
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			2.75
Combined Safety Factor, $S_{Total} = S_A \times S_B$					5.5
Observed Infiltration Rate, inch/hr, K_{obs} (corrected for test-specific bias)					19.2
Design Infiltration Rate, in/hr, $K_{design} = K_{obs} / S_{Total}$					3.49

Briefly describe infiltration test and provide reference to test forms:
Observed infiltration rate was determined by of test pit TP-04. GMU conducted the testing using the Shallow Percolation Test Procedure. Test pit location and rate can be found in the August 6, 2014 geotechnical report included in Appendix N.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

Worksheet 3: Factor of Safety and Design Infiltration Rate and Worksheet - 4E-2

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			2
B	Design	Tributary area size	0.25	3	0.75
		Level of pretreatment/ expected sediment loads	0.25	3	0.75
		Redundancy/contingency plan	0.25	3	0.75
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			2.75
Combined Safety Factor, $S_{Total} = S_A \times S_B$					5.5
Observed Infiltration Rate, inch/hr, K_{obs} (corrected for test-specific bias)					1.9
Design Infiltration Rate, in/hr, $K_{design} = K_{obs} / S_{Total}$					0.35

Briefly describe infiltration test and provide reference to test forms:
Infiltration testing has not been performed at this location yet. The observed infiltration rate used is an estimated rate based on TP-01 located on the opposite side of San Juan Creek which GMU conducted the testing using the Shallow Percolation Test Procedure. Test pit location and rate can be found in the August 6, 2014 geotechnical report included in Appendix N.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

Worksheet 3: Factor of Safety and Design Infiltration Rate and Worksheet - 4F-2

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			2
B	Design	Tributary area size	0.25	3	0.75
		Level of pretreatment/ expected sediment loads	0.25	3	0.75
		Redundancy/contingency plan	0.25	3	0.75
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			2.75
Combined Safety Factor, $S_{Total} = S_A \times S_B$					5.5
Observed Infiltration Rate, inch/hr, K_{obs} (corrected for test-specific bias)					1.9
Design Infiltration Rate, in/hr, $K_{design} = K_{obs} / S_{Total}$					0.35

Briefly describe infiltration test and provide reference to test forms:
Infiltration testing has not been performed at this location yet. The observed infiltration rate used is an estimated rate based on TP-01 located on the opposite side of San Juan Creek which GMU conducted the testing using the Shallow Percolation Test Procedure. Test pit location and rate can be found in the August 6, 2014 geotechnical report included in Appendix N.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.